

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS

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Claim 1 (Currently Amended). A method for the vectorization of line objects in at least one of a colour ~~or~~ and a grayscale image comprising ~~the steps of~~:

- (a) collecting sample data of line points on line objects within ~~said~~ the image[,];
- (b) extracting multiple features from the collected sample data to represent characteristics of the line points[,];
- (c) grouping ~~said~~ the data into a plurality of clusters in a multi-dimensional feature space, each ~~said~~ cluster comprising a plurality of line points having feature measures within a selected criteria set[,];
- (d) detecting ~~further~~ line points by matching image points to ~~said~~ the clusters and rejecting image points not falling within any cluster[,];
- (e) performing a line tracing operation based on the detected line points and features; and
- (f) identifying and correcting possible errors.

Claim 2 (Currently Amended). A The method as claimed in claim 1 wherein ~~said~~ the sample data is collected interactively by ~~means of~~ a user identifying two points on a line ~~and said~~, the sample data corresponding to line points being between ~~said~~ the identified points.

Claim 3 (Currently Amended) A The method as claimed in claim 2 ~~wherein the further~~ comprising locating a line centre of each line point ~~is located~~ prior to ~~said~~ extracting the multiple multiple features ~~being extracted~~.

Claim 4 (Currently Amended). A The method as claimed in claim 3 ~~wherein the further~~ comprising locating a line centre of each identified detected point is also located.

Claim 5 (Currently Amended). A The method as claimed in claim 3 wherein the line centre is located by determining the peak of ~~the~~ a colour ridge profile of the line at ~~the point~~ a location of the point.

Claim 6 (Currently Amended). A The method as claimed in claim 3 wherein the line centre is located by determining ~~the~~ a peak of ~~the~~ a colour profile line width average function at ~~the point~~ a location of the point.

Claim 7 (Currently Amended). A The method as claimed in claim 1 wherein ~~said~~ the features are selected from ~~the~~ a colour, a line profile, a line width, a line direction and a spatial location of the line points.

Claim 8 (Currently Amended). A The method as claimed in claim 1 wherein the features at each step of the method in which they are used are independently selected.

Claim 9 (Currently Amended). A The method as claimed in claim 1 wherein the sample data is clustered ~~in such a way~~ that the clusters occupy a minimum area in feature space.

Claim 10 (Currently Amended). A The method as claimed in claim 1 wherein image points are matched to clusters by ~~means of a decision making operation that matches~~ first matching colour data ~~firstly~~ and ~~uses~~ then matching other data to verify the match.

Claim 11 (Currently Amended). A The method as claimed in claim 10 wherein the other data is comprises profile data.

Claim 12 (Currently Amended). A The method as claimed in claim 1 wherein detected line

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points act as seeds for a line tracing algorithm.

Claim 13 (Currently Amended). A The method as claimed in claim 7 12 wherein ~~said~~ the algorithm is carried out automatically.

Claim 14 (Currently Amended). A The method as claimed in claim 13 wherein ~~said~~ the algorithm comprises comparing each potential line point within a look-ahead window with a known line point at ~~the~~ an end of a line segment and adding ~~the~~ a best match line point to the line segment.

Claim 15 (Currently Amended). A The method as claimed in claim 14 wherein all potential line points between the end of the line segment and the best match line point <sup>are</sup> also added to the line segment.

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Claim 16 (Currently Amended). A The method as claimed in claim 14 wherein ~~if~~ when the best match line point is ~~itself~~ the an end point of a another line segment, the two line segments are merged.

Claim 17 (Currently Amended). A The method as claimed in claim 12 wherein ~~said~~ the algorithm is performed interactively by a user selecting a line point for commencement of a the tracing algorithm which continues until no more acceptable line points are found.

Claim 18 (Currently Amended). A The method as claimed in claim 1 wherein ~~said~~ the error identification and correction comprises an interactive process in which possible errors are presented to a user for verification or correction.

Claim 19 (Currently Amended). A The method as claimed in claim 18 wherein ~~in the event~~ of when an error ~~being~~ is detected, a the user may select from a ~~number~~ plurality of error correction operations.

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Claim 20 (Currently Amended). A The method as claimed in claim 19 wherein ~~said the~~ error correction operations include a smoothing ~~whereby the~~ operation by which a curve of a line may be ~~is~~ smoothed by fitting ~~said the~~ line to a spline.

Claim 21 (Currently Amended). A The method as claimed in claim 19 wherein ~~said the~~ error correction operations include filtering to remove unwanted points.

Claim 22 (Currently Amended). A The method as claimed in claim 19 wherein ~~said the~~ error correction operations include ~~the~~ joining of line segments.

Claim 23 (Currently Amended). A The method as claimed in claim 22 wherein two line segments ~~may be~~ are joined by ~~means of~~ a curve fitted to a plurality of points in each line segment.

Claim 24 (Currently Amended). A The method as claimed in claim 18 including character recognition for recognising and deleting characters erroneously identified as line objects.

Claims 25-26 (Canceled).

Claim 27 (New). An apparatus for vectorization of line objects in at least one of a colour and a grayscale image, the apparatus comprising:

a collector that automatically collects sample data of line points on line objects within the image;

an extractor that extracts multi-dimensional feature measures from the sample line points;

a classifier that groups the data into clusters, each cluster having a plurality of line points having feature measures within a selected criteria set;

a detector that detects line points by matching image points with the clusters, and that rejects image points that do not match any of the clusters; and

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a line tracer that performs a line tracing operation based on detected line points and features.

Claim 28 (New). The apparatus as claimed in claim 27, further comprising an error corrector that identifies and corrects errors.

Claim 29 (New). A method for vectorization of line objects in at least one of a colour and a grayscale image, the method comprising:

generating a plurality of prototypes from sample line points of the image, each prototype comprising a cluster of a set of the sample line points having parameters within defined ranges; and

detecting line points of the image by comparing image points with the prototypes;

wherein each image point that matches at least one prototype is assigned to a line point and each image point that does not match at least one prototype is rejected.

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